

CERTIFICATE

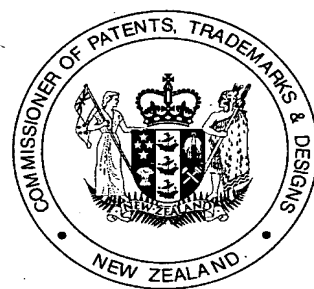
This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 28 June 2002 with an application for Letters Patent number 519834 made by RUSSELL ZELANY CHRISTENSEN.

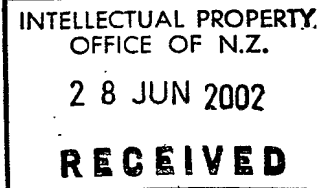
Dated 9 October 2003.



Neville Harris
Commissioner of Patents, Trade Marks and Designs



PATENTS FORM NO. 4.
Patents Act 1953



PROVISIONAL SPECIFICATION

(a) Puzzle Game

I (b) Russell Zelany Christensen, of 79 Bridge St, Eltham, New Zealand, a New Zealand citizen, do hereby declare this invention to be described in the following statement:

(c)

This invention is means for and method of playing a game which develops the subject matter of U.S. patent 4,632,399.

An apparatus for making rotational mechanical puzzles is depicted in figures 8, 9, 10, 11 and 12 of U.S. patent 4,632,399. According to the known art, a set of puzzle components can be assembled in a large variety of different ways. The assemblage once complete and randomised prevents the user from disassembling the apparatus until the puzzle it makes has been solved. Both the process of randomisation and the process of solution require torque to be selectively applied to certain coaxial annular elements in the apparatus. These elements are mounted on a semi-tubular limiter.

The current invention develops the known art by extending the limiter to provide control means including a housing wherein a small extraneous item may be stored. Release of the item from the housing is prevented until the apparatus is disassembled. As mentioned above, this may require a puzzle to be solved. In solving the puzzle, torque may be more easily applied to said elements when the

user holds said housing in one hand. The housing may thus provide a body of reference in relation to which relevant rotations and translations can be calculated as well as a place for the temporary storage of an extraneous item.

The invention further develops the known art by the provision of a catch which at one end of the core may prevent toddlers from having access to the small parts in the core.

Said core is slidable in the limiter to selectively determine the rotatable elements. In accordance with the known art, it comprises two long rigid members and a sequence of small projectional units. Normally the known art core is held together by the action of the limiter. However when it is removed from the limiter, the long rigid members readily separate and the small projectional units fall out.

In a game context, in accordance with the invention, a first player may be challenged to solve a puzzle by the second player. In this context, removal of the core is a dramatic expression available to the first player, when and only when they have solved the puzzle, to indicate their triumph and to draw attention to the ensuing release of the extraneous item from the housing. The aforementioned catch ensures that this dramatic expression is not accompanied by spillage of small projectional units from the core.

Thus the invention provides a novel means of interaction for parent and child according to which the parent, being the second player above-mentioned, can challenge the child with puzzles of various degrees of difficulty and, in each case, leave the child unwatched to solve the puzzle and extract the core if they are able. While this interaction may not be intended by the manufacturer of the invention, specifically as respects interaction between a parent and a child less

than three years of age, yet the puzzle will very likely attract children even at two years of age by its appearance. Moreover there will be at least one way in which said sequence of small projectional units could be determined in the parent's assembly of the apparatus to make a simple puzzle wherein manipulative skill would be more the determining factor of success than intellectual ability. So the potential for use of the invention is enhanced by the catch.

Indeed it is an object of the invention to provide a colourful plastic contrivance that is attractive to potential users of all age groups from 18 months old, which may therefore come into a household as a uniquely valuable educational game.

It is a further object of the invention to provide a puzzle means which can be assembled to form puzzles of various degrees of difficulty. The invention further develops the known art in this regard by means of a lid for said housing. Said lid may be formed during its manufacture so that when attached to said housing it extends the housing by a whole number multiple of the longitudinal extent of any one of said elements on the limiter. When the apparatus is assembled without the lid, additional annular elements may be supplied to replace the lid on the limiter. The latitudes provided to permit rotation of said elements on the limiter will then be preserved as said additional elements will take up exactly the same space longitudinally on the limiter as the lid would have done. At the same time, the difficulty level of puzzles made with the apparatus will increase.

These and other aspects of the invention are illustrated in the drawings as hereinafter outlined wherein figures 1 - 7 show various parts of a first apparatus and figures 8 - 9 show a second apparatus in accordance with the invention.

Figure 1 is an exploded isometric view of a semi-tubular limiter showing also the attached housing 60, lid 63 and annular elements 65s.

Figure 2 is a cross-section through housing 60 in a plane perpendicular to the axis of rotation showing a boss 66 which fixes the housing on the limiter.

Figures 3 and 4 are cross-sectional views showing the catch at one end of the core of said first apparatus. Figure 3 shows the catch just prior to its engagement during the process of assembling the core. Figure 4 shows the catch afterward as it secures the core.

Figure 5 is a plan view of a core in accordance with the invention including a detachable handle 99.

Figure 6 is a cross-sectional view of the handle 99 showing protuberance 89 which is adapted to engage catch part 114 when the handle is deployed to release the catch. In figure 6, handle 99 is shown detached from the core.

Figure 7 is a cross-sectional view of the semi-tubular limiter of figure 1. Shown secured on the limiter are the housing 60 and the lid 63. Lid 63 has been fully connected to housing 60 in this drawing so that just sufficient space remains on the limiter for a whole number of elements 65s to be rotatably confined at the closed end of lid 63.

Figure 8 is a cross-sectional view of the apparatus of figure 9, showing a lid 207 which differs in its construction from the lid of said first apparatus. The plane of the cross-section separates lid 207 from the adjacent annular element 201.

Figure 9 is a pictorial view of a complete apparatus in accordance with the invention. The apparatus is shown here in its solution state wherein the core may be directly slid out of the limiter without further rotation of annular elements on the limiter.

With reference to figure 1, congruent annular elements 65s are employed in said first apparatus, each with six equally spaced interior keyways including one keyway larger than the rest. A semi-tubular limiter 61 is bifurcated at one end whereby the lips 69, 70 at that end may be pressed together to facilitate the mounting of said annular elements on 61. At the other end of 61, housing 60 is secured.

Housing 60 includes an interior wall 72, an exterior wall 71 and radial walls 73, 74 whereby it defines a cavity 67 sealed at one end. Interior wall 72 subtends 270 degrees only in a plane orthogonal to the axis of rotation 75. Elements 65s may be manually rotated on limiter 61 about this axis. At the sealed end, wall 71 slopes toward axis 75 to meet wall 72.

Whereas limiter 61 presents an equable surface as an arbor for elements 65s, this surface may be extended in abutment with said interior wall 72 for the length of housing 60. Protruding boss 66 molded into said surface is tightly accommodated in a recess defined by wall 72. By this means housing 60 and limiter 61 form an integrated whole which the end user of the apparatus is not invited to disassemble. Additional attachment means such as glue may be employed to completely secure 60 to 61.

At the open end of cavity 67 sufficient space is provided on said cylindrical surface for seven elements 65s. When all seven are accommodated on limiter 61

(without lid 63) walls 72 and 71 form annular stops which cooperate with the lips 69, 70 to confine the elements 65s in preparedness for their use in a puzzle to be made with the apparatus. General principles concerning the operation of the puzzle are described in U.S. patent 4,632,399 with reference especially to figures 8 - 12.

By way of an alternative mode of construction, the user may choose to deploy lid 63 on limiter 61 instead of a certain number of the elements 65s. By reducing the number of elements 65s in the puzzle, the user may construct a simpler puzzle. Preferably lid 63 replaces three only elements 65s, although it may replace four as I have suggested in figure 1 or some other number as would be clear to those skilled in the art.

With reference to figure 7, lid 63 has an interior wall and an exterior wall which will extend the interior wall and exterior wall respectively of housing 60 in parallel to axis 75. Thereby lid 63, when mounted on 61 to abut with 60, extends cavity 67 and stops it with a radial wall 86 at the closed end of 63. At this end, said radial wall externally cooperates with lips 69, 70 to confine elements 65s on the limiter. At the other end of lid 63, a curved lip 64 protrudes into cavity 67 to bind housing 60 and lid 63 together.

Along most of its length, lid 63 defines a gap 68 generally subtending 90 degrees in a plane orthogonal to axis 75. Lip 64 adds to the length of 63 and subtends less than 270 degrees so that gap 68 is wider at lip 64 than it is elsewhere. Inside cavity 67, lip 64 serves to rotationally limit lid 63 relative to housing 60, through its confinement by said radial walls 73, 74.

Lid 63 is formed from a resilient plastic and may be squeezed to slightly reduce the size of gap 68. When held squeezed thus, lip 64 slides easily into the cavity 67 defined by housing 60. Upon releasing the pressure on 63, the user will find that lip 64 forcefully abuts with the inside of exterior wall 71. The force of friction then stops lid 63 from moving longitudinally along 61 to inadvertently obstruct the rotation of elements 65. This is due to boss 66 which, as shown more particularly in figure 7, securely locates housing 60 longitudinally of the axis relative to 61.

In order to facilitate the mounting (and later demounting) of lid 63, the lip 64 may be reduced at the extremity of its first insertion into the cavity 67. From there it may embody a gradual widening so as to rotationally limit lid 63 more and more as the lid is brought to its resting place against housing 60. At its final place of rest, ready for the mounting of elements 65s at its end, any rotational latitude for 63 relative to 60 should be minimal. Thus lid 63 and housing 60 are designed to present an integrated structure which the user may hold in one hand when rotationally manipulating elements 65s on the limiter.

In further deviating from the prior art, the invention provides a handle 99 which may be turned relative to said integrated structure in order to provide sixty degree rotation of a selected subset of the elements 65s. With reference to figure 5, torque may be transmitted from handle 99 to selected elements 65s through semi-cylindrical long member 119 (shown with its concavity facing out of the page) and projectional units, such as unit 21 for example, which have been rotationally locked to 119 in the assembly of a core for the puzzle. The invention may include means of attachment of handle 99 to long member 119 whereby 99 may be released from 119 and temporarily deployed at the opposite end of the core.

With reference to figure 4, spindle 112 is molded to bead 143 as if to extend through a hole in the bead and when emerging from the bead spindle 112 forms a resilient bend at a point 195 (close to 143) to provide a catch part 114. The user may complete the assembly of a puzzle core by lodging catch part 114 in a certain confined space defined by rigid long member 140 at one of its ends. As member 140 is lowered into position, it moves to engage selected ones of the projectional units such as unit 22 for example (see figure 5). It is prevented from reaching its full engagement by abutting with catch part 114 as shown particularly in figure 3. By exerting more force, the user may now cause spindle 112 to be temporarily bent by member 140 at 195. This engenders a small movement of catch part 114, allowing the wall part 137 of member 140 to slide past 114. When 114 resiles, it moves into a space defined by wall parts 137 (bottom), 136, 135 (sides) and 176 (end) at one end of the long member 140. It is trapped in there, as shown particularly in figure 4, until such time as it may again be forced aside from 137.

With reference to figure 5, grooved long member 140 defines groove 141 adapted to slidably locate the ridge 62 of the semi-tubular limiter. At the end opposite 137, member 140 has a flange 139 which defines a hole for spindle 112.

The spindle 112 is molded as a separate component including bead 143 and catch part 114. During assembly of the core, the spindle 112 is inserted first through bearing means 144, 145 attached to semi-cylindrical long member 119 at the end opposite handle 99. The bearing means 144, 145 may be included with the same molding as member 119 and defines a hole for spindle 112 which closely fits the spindle without preventing rotation of the spindle relative to 119.

With reference to figure 5, after inserting the spindle 112 through said bearing means, the user may mount projectional units on the spindle one by one, bringing some of them into rotational engagement with long member 119. Spindle 112 is then inserted through a hole defined by flange 111 which flange may also be included in the same plastic molding as member 119. Thus holes in 145 and 111 define positions for spindle 112 at the ends of the pattern of projectional units assembled in the core. These positions are defined in relation to member 119 to facilitate rotation of member 119 about the longitudinal axis of the spindle 112. Thus when an assembled puzzle core is put into the limiter and its cargo, the axis 75 (ie the axis of rotation for elements 65s on the limiter) will approximately coincide with the longitudinal axis of spindle 112 as the exterior surface of 119 rotatably abuts with the interior surface of limiter 61.

During the user's assembly of a puzzle core, spindle 112 is finally inserted through a hole in said flange 139 possessed by long member 140. Here member 140 rotatably abuts with flange 111 of member 119. Then member 140 is brought down on catch part 114 at the other end of the core as previously described.

Member 119 extends beyond said abutting flanges (longitudinally of the axis) to lodge frictionally in a recess defined by handle 99. When 99 and 119 are lodged together for normal puzzle operation they form an integrated whole assisted by the bonding force of friction to transmit torque from the user's hand. Torque is applied by the user between handle 99 and housing 60. It may cause rotation of one element 65 relative to another if the two elements 65s are suitably positioned longitudinally of the axis relative to the pattern of projectional units in the core.

With reference to figure 6, handle 99 may define a recess 90 adapted to accommodate the structure of walls 135, 136, 137 and 176 at one end of long

member 140. Handle 99 comprises a generally cylindrical outer wall which forms the user's grip surface and a flat interior web wall 91 normal to the geometrical axis of the cylinder (this axis is also the axis of spindle 112 when the handle 99 is attached to 119). The interior web wall creates a forward compartment in which two concentric annular walls define an annular gap therebetween for semi-cylindrical long member 119. This forward compartment is not shown in detail but the web wall also creates a rear compartment in which, as shown in figure 6, a wall 93 perpendicular to the web wall defines the recess 90. Inside recess 90, also protruding from the web wall at ninety degrees, a slender protuberance 89 is firmly mounted. It is envisaged that 89 would be part of the same plastic molding as the other parts of handle 99.

With reference to figure 6, recess 90 is so shaped by wall 93 that it will accommodate the end of the long member 140 only when that member is oriented in a way that brings protuberance 89 and hole 88 (refer figures 3 and 4) into close proximity. This facilitates the user to insert protuberance 89 into 88 and apply force to catch part 114. When 114 has been moved clear of 137, protuberance 89 may be withdrawn and the long member 140 may be drawn away. Spindle 112 may then be withdrawn, releasing the projectional units and allowing a different puzzle configuration to be embodied.

With reference to figure 9, said second apparatus is constructed broadly the same way as said first apparatus. Whereas each annular element 201 defines one large keyway and five smaller ones, in the puzzle solution state as shown in the drawing each element 201 has been positioned on the limiter so that its large keyway is lined up with the obtruding delayer means 202 at the catch end of the core. In this state, by pulling handle 203 in relation to the housing 208 and lid 207, the core may be slid out of the limiter.

With further reference to figure 9, but broadly in description of the invention, it may be appreciated that the core is wand-like, a quality rendered by the use of a handle (e.g. handle 203) to impart torque to the exclusive lot of annular elements selected by positioning of the core for rotation relative to their arbor. In the prior art puzzle apparatus, torque was applied directly to the elements themselves and the core had no significance except as a control means for the manipulation of the elements.

Whereas a wand-like core invites its own waving around after its withdrawal from the limiter, in the current invention the core acquires further significance as a means of gesturing. It may be held by handle 203 and pointed in the air, after its withdrawal from the limiter, as a gesture of triumph.

With reference to figure 8, handle 203 is rotationally engaged to long member 209 and hence to some of the projectional units, e.g. unit 210. Each projectional unit includes a barrier 211 penetrating a zone in which one of the annular elements may be installed by sliding motion of the core in the limiter. When an annular element 201 is installed in the zone controlled by unit 210, it may be rotated on the limiter by the application of torque to handle 203. On the other hand, when an annular element 201 is installed in the zone controlled by unit 212, it is not permitted to rotate on the limiter except to a small extent defined by the size of its keyway in relation to barrier 211. Unit 212 is rotationally engaged to long member 213 which is turn rotationally engaged to the limiter in accordance with the known art.

Said wand-like core can thus be used in the puzzle assembly to randomise the annular elements 201s, as well as to return them to their solution state and then,

upon its withdrawal, to signal a player's triumph. Premature withdrawal of the core is prevented by the obtruding delayer means 202 which can pass through one only of the keyways defined by an element 201, the other five keyways being large enough to accommodate barrier 211 but not the delayer means 202.

A game in accordance with the invention may be enhanced by the specification of a curriculum of puzzles in the instruction material. Said curriculum may suitably contain a dozen puzzles specified in reference to the sequence of projectional units of the puzzle core, each specification determining, for each projectional unit, whether it is rotationally engaged to long member 213 or alternatively to long member 209. The game may then involve an adopting or a modifying of this curriculum by the players followed by a series of rounds or sub-games in each of which a puzzle is assembled by one of the players and solved by the other.

Where said other is an infant, there may be no reciprocal action, no swapping of these roles. The infant may graduate through the curriculum and the parent who assembles the puzzles may merely be the facilitator. Where the players are more equally matched, the game may involve reciprocal action, so that each player may graduate through the curriculum, and time limits to keep the action lively.

If the puzzle apparatus has four annular elements and sixteen projectional units like, for example, the apparatus of figures 8 and 9, a time limit of the order of 60 seconds or thereabouts may allow sufficient wins in sufficiently many cases, as between adults and older children. Timing would begin upon the handover of the assembled and randomised apparatus. In this context, the withdrawal of the core from the limiter would signal completion of the timed action and a gesturing with the core could be an accompaniment to this completion, assuming completion to have been achieved within the accepted time limit.

Broadly stated then, according to one of my claims, the invention provides a means for playing a game which comprises a first member and a second member, which comprises a set of annular elements, and which displays a form in which said elements are coaxially pinned, in which said members are mutually engaged longitudinally of the common axis of said elements, in which said second member is pivoted for rotation in relation to said first by means held in by a catch, and in which said members penetrate common zones in line lengthwise of said axis, in each of which zones there is a barrier extending from one of said members to rotationally limit the one of said elements, if any, which is installed in the zone, whereby, given said form, certain rotations of said second member relative to said first permit respective rotations of an exclusive lot of said elements, the make-up of which lot is variable by movements of said elements, each from one of said zones to another so that an arrangement of said elements may be attained in which said members may be slid away from said axis immediately to remain in mutual engagement through the action of said catch, despite the absence of said elements, whereas said catch releaseably checks the motion of said second member away from said first, keeping said members mutually longitudinally engaged.

This claim adapts the first claim of U.S. patent 4,632,399 by adding the catch and confining the subject matter. The or any catch, in the environment of the confined subject matter, with the function I claim, is a novelty for which there is value in the playing of a game as I have outlined above. However the game itself may be subject to another claim which mentions the temporary storage of an

extraneous item in a housing so as to prevent access to the item subject to the solving of a manipulative puzzle by rotations and translations of a handle in relation to said housing. For the purposes of this other claim, the catch would not be an essential component. Moreover, I may proceed to narrow this other claim by not immediately adding the catch.

In the apparatus of figures 8 and 9, the catch part 206 has a rounded external aspect to give the assembled apparatus, as a whole, a rocket-like appearance. Correspondingly the handle defines a circular recess 205 adapted to accept catch part 206 when the handle is removed for deployment as a catch release means in accordance with the procedure outlined for the apparatus of figures 3 and 4. In the case of the apparatus of fig. 9, the procedure also involves aligning protuberance 204 in the handle so that it may penetrate the hole in catch part 206.

Whereas the game may not involve a procedure to release a catch, nevertheless it will involve a process of disassembly and reassembly for a sequence of projectional units in a core attached to the handle whereby in each of a series of rounds the manipulative puzzle is prepared, the preparations also mounting coaxial annular elements at the housing door so as to block access to the item in temporary storage.

Congruent annular elements are preferred and have been employed in both of the apparatuses depicted. Where congruent annular elements are employed, they are preferably supplied in a single colour whereas colour differences between them would frustrate the educational value of using colour to identify the elements once mounted. For the purposes of discussing puzzle solutions, it is essential to identify the annular elements by their ordinal position proceeding

along their common axis of rotation. To this end, reference fig. 9, the coloured markers 214, 215, 216 and 217 have been included in said second apparatus as separately molded pieces which are attached to the lid 207 at the time of manufacture, after molding. Preferably each marker is a different colour and each colour stands out from the background colour of the lid.

With reference to fig. 8, lid 207 does not close off the storage space for an extraneous item as does lid 63 but provides a loose birth for an extraneous item of dimensions known at the time of manufacture of the lid. For example, the item may be a coin in common use. Thus the internal structure of the lid 207 is designed to hold the item 218 in a defined position within the storage space and to facilitate the item's removal without the removal of the lid from the limiter.

At the end of each of a series of rounds an extraneous incentive 218 may be removed from the lid 207 and replaced by a similar item before the beginning of the next round. Where the rounds involve a time limit as outlined above and where a player fails to withdraw the puzzle core within the allotted time, that player may forfeit the incentive inside and the challenge to remove the core may pass to the other player in the game. If said other also fails this challenge in an equal space of time, the incentive may pass back, when it is finally released, to an incentive pool adapted to facilitate the passage of the game through a planned series of matches. The players may contribute to this pool at the start of the game.

Improvements and modifications to the invention as would be obvious or known in the art are envisaged and may be incorporated without departing from the scope and the spirit of the invention.

The following numerals were applied to the drawings but have not been used in the specification: 109, 142, 144, 155, 175, 194.

R Z Christensen

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Inventor

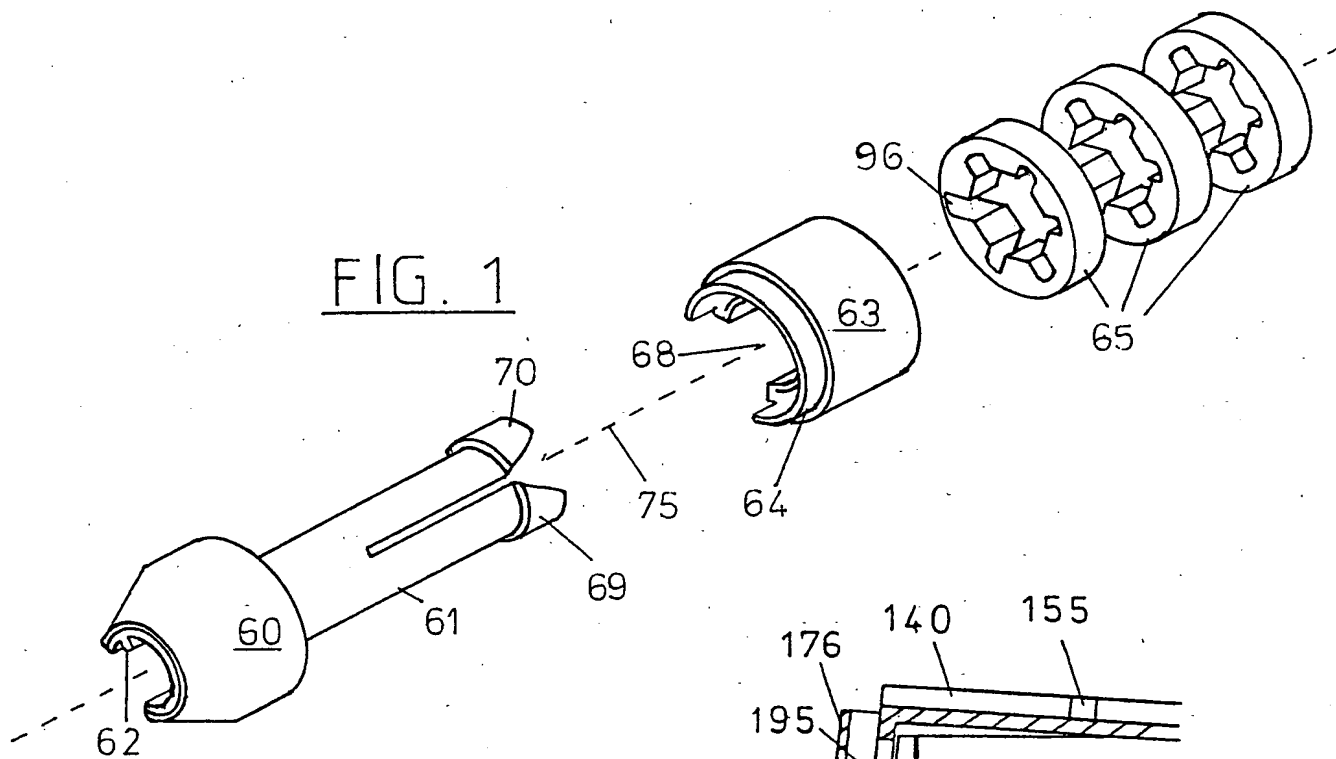


FIG. 1

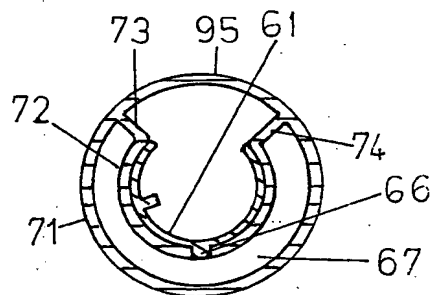


FIG. 2

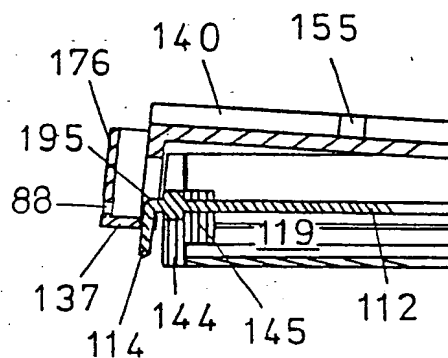


FIG. 3

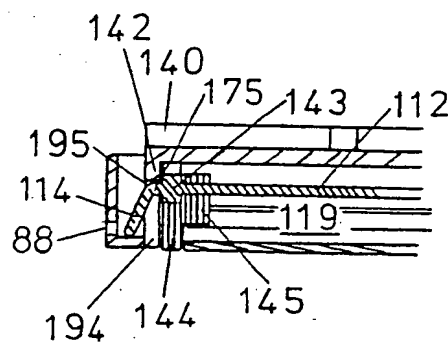
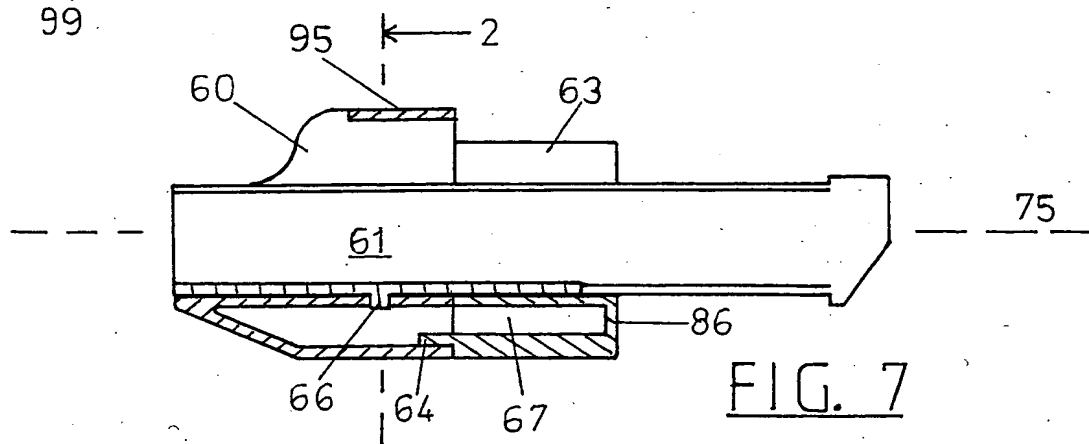
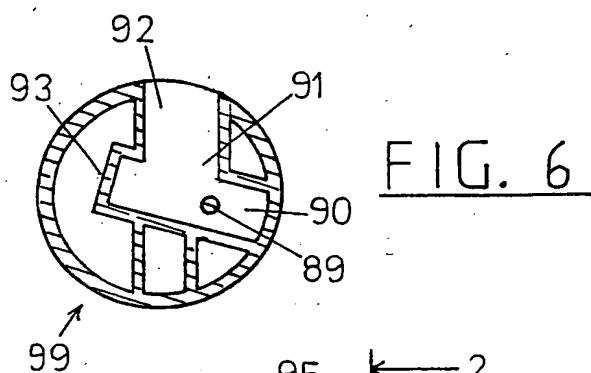
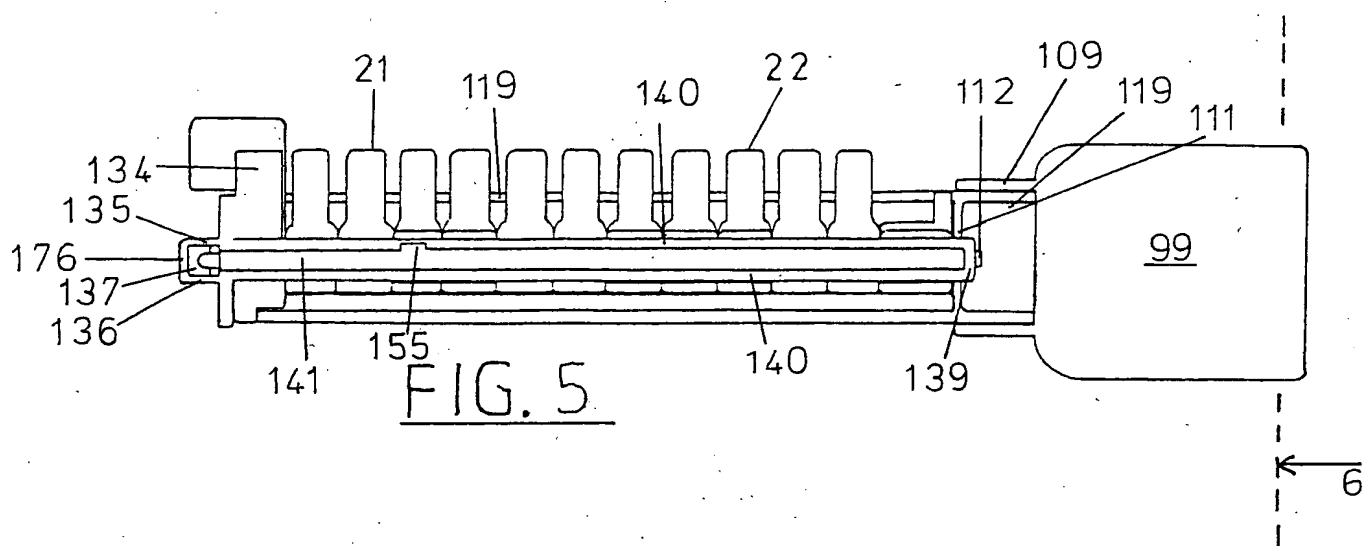


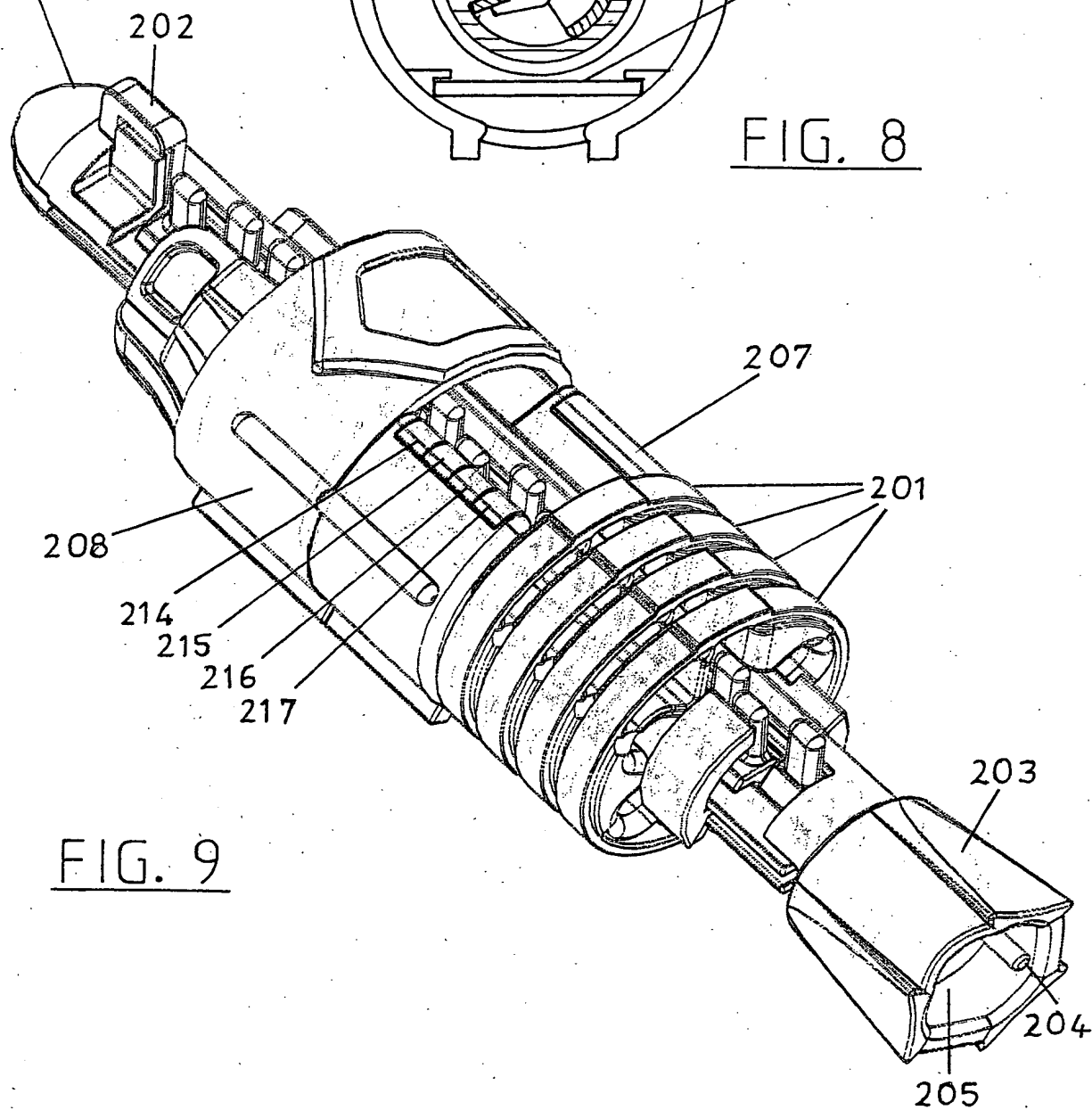
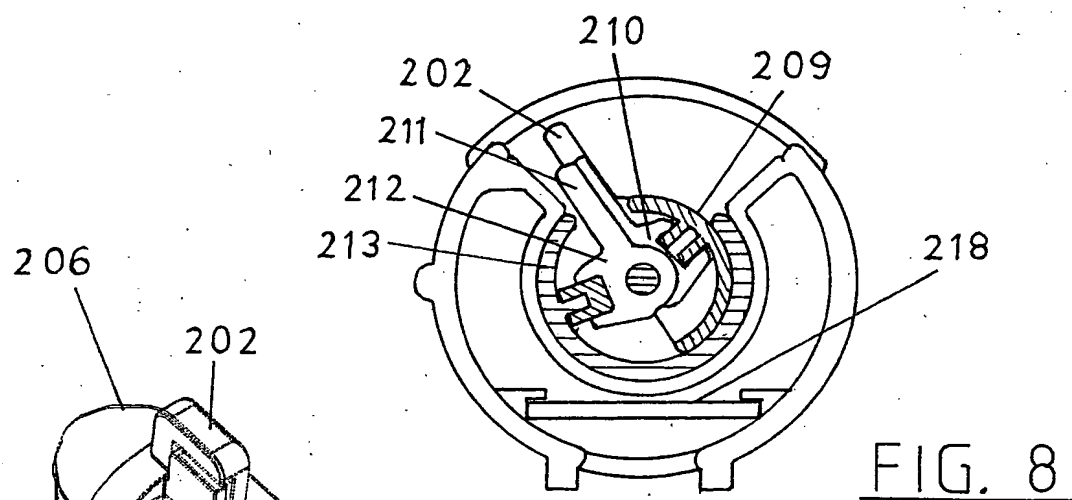
FIG. 4

R 3 charts



R Z CHRISTENSEN
SHEET 2 OF 3

R Z Christensen



R Z CHRISTENSEN
SHEET 3 OF 3

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